REMARKS

I. Summary of the Office Action and this Reply

Claims 30, 32-39 and 44-49 are pending; claims 40-43 have been withdrawn from consideration. The Examiner has rejected claims 30 and 33 under 35 U.S.C. §102(b), asserting that such claims are anticipated by WO 98/41531 to Blanchard ("Blanchard").[1] Further, the Examiner has rejected claims 30 and 33 under 35 U.S.C. §103(a), asserting that such claims are obvious over Blanchard. Further still, the Examiner has rejected claims 34 and 39 under 35 U.S.C. §103(a), asserting that such claims are obvious over Blanchard in view of U.S. Patent No. 5,959,098 to Goldberg et al. ("Goldberg"). The Examiner has rejected claim 32 under 35 U.S.C. §103(a), asserting that such claims are obvious over Blanchard in view of U.S. Patent No. 4,856,456 to Hillman et al. ("Hillman"). Claims 35-38 stand rejected under 35 U.S.C. §103(a), over Blanchard in view of U.S. Patent No. 6,165,778 to Kedar ("Kedar"). Claim 38 stands rejected under 35 U.S.C. §103(a) over Blanchard in view of U.S. Patent No. 5,362,447 to Nokihara. ("Nokihara").

In this Reply, claims 30, 38, 44, 48 and 49 are amended; new claim 50 is added. No new matter is added; support for the amendments can be found, *inter alia*, at page 5, lines 22-24, page 16, lines 16-18, and page 17, lines 19-20 and 33-34.

II. Response to 102 Rejections

A rejection under 35 U.S.C. §102 is proper only if each and every element of the

[1] It is stated in paragraph 5 of the Action that claim 31 stands rejected under section 102(b). However, claim 31 has been canceled.

claim is found in a single prior art reference. MPEP § 2131. The Examiner has rejected claims 30 and 33 under 35 U.S.C. §102(b), asserting that each and every element of these claims are found in Blanchard.

Claims 30 and 33

Independent claim 30 is directed to an apparatus for synthesizing an array of biopolymers on the surface of a support. In response to the Examiner's comments at page 4, lines 18-19 of the Action, claim 30 has been amended to recite "a plurality of flow cells", "a mechanism for moving . . . said support from one flow cell to a different flow cell", and "a controller for controlling the movement of said mechanism, said controller comprising a computer program that is . . . configured to cause said mechanism to move said support from one flow cell to a different flow cell." See application, page 16, lines 16-18, page 17, lines 19-20 and 33-34. Accordingly, the amended claim more clearly recites that the apparatus includes a certain mechanism, and a certain controller that is configured to cause the mechanism to move the support between different flow cells. Such a mechanism and such a controller are neither taught nor suggested by the cited art. Further, as stated on page 4 of the Action, Blanchard is silent regarding transporting of a substrate from one flow cell to a different flow cell, as discussed in detail below with reference to claim 30 and the rejection under section 103. As described in the application, the apparatus includes a plurality of flow cells that are dedicated to different steps in the synthesis of chemical compounds, and the apparatus moves a single support between different flow cells during synthesis. In this way, a substantial reduction in cross-contamination is realized and system design is

simplified. Page 5, lines 22-25; page 14, lines 16-18. For at least this reason, Blanchard fails to disclose such a mechanism and such a controller. Therefore, Blanchard fails to disclose all claim limitations. Accordingly, reconsideration and withdrawal of the rejection of claim 30 are requested respectfully.

Claim 33 depends from claim 30. Reconsideration and withdrawal of the rejection of claim 33 are requested for reasons similar to those set forth above for claim 30.

III. Response to 103 Rejections

A section 103 rejection is proper only if all claim limitations are taught or suggested by the cited art. Moreover, even if all elements are found in the cited art, there still must be motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to make the proposed modification to the cited art. MPEP §2143.

Claims 30 and 33

Independent claim 30 stands rejected under section 103 over Blanchard. As discussed above, Blanchard fails to disclose "a mechanism for moving . . . said support from one flow cell to a different flow cell" and "a controller for controlling the movement of said mechanism, said controller comprising a computer program that is . . . configured to cause said mechanism to move said support from one flow cell to a different flow cell."

The Action states that Blanchard discloses a controller for controlled movement of the Blanchard apparatus' mechanism, and cites the computer controlled transport arms (page 74, lines 8-31) in support of this assertion. Page 3, paragraph 5. However, it should be noted that the portion of Blanchard cited by the Action relates a controller for the causing moving of the substrate relative to the print head assembly 24, which relates to control of the scanning transport 22; it does not relate to control of the treating transport 23 that moves the substrate to and from the flow cell 30. In contrast, the claimed controller comprises "a computer program that is . . . configured to cause said mechanism to move said support from one flow cell to a different flow cell." See claim 30.

The Action acknowledges that Blanchard is silent regarding whether the substrate is transported into "another" flow cell. Page 4. The Action states that it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to provide the transporters of Blanchard with a program to move the substrate from one flow cell into a different flow cell.

As discussed in Applicant's last Reply, Blanchard provides no teaching or suggestion of moving a support from one flow cell to a different flow cell, or employing dedicated flow cells in the manner employed by Applicant. Thus, there would be no motivation for one skilled in the art to modify the apparatus of Blanchard to include a mechanism and a controller for moving a single support from one flow cell to another different flow cell. Instead, Blanchard discloses that a single substrate may be repeatedly moved to and from a single flow cell 30, which "treats" the substrate. See Reply, page 9; Blanchard page 58, lines 1-12.

In support of the Action's assertion that it would have been obvious to provide the transporters of Blanchard with a program to move the substrate from one flow cell into a different flow cell, the Action cites Example 2 of Blanchard. As noted on page 5 of the Action, Example 2 of Blanchard involves submerging the substrate in a bath of oxidizing solution, dipping the substrate in a solution of 2.5% dichloroacetic acid, and dipping the substrate in ethanolamine, with intervening rinsing and drying steps. Blanchard, pages 82-85. The Action asserts that this "clearly suggests that the substrates are transported to different flow cells for the (b) acetonitrile rinsing, (c) oxidation, (d) acetonitrile rinsing, (e) dimethoxytrityl deprotecting and (f) acetonitrile rinsing steps."

Contrary to this assertion, the submerging and dipping of the substrate in these steps could not have occurred in the flow cell 30 of Blanchard (Figure 9). As disclosed in Blanchard, the flow cell 30 includes stationary and moving plates 70, 72, between which the substrate is braced. Page 64, line 18 – page 65, line 15. The stationary plate 70 includes a vertical surface 80 having a raised circular ring 82 made of a material that can withstand contact with the solvents used to treat the substrate. The ring 82 surrounds all portions of the substrate upon which reagents have been deposited. A substrate pressed against the raised ring 82 forms a sealed chamber that is bounded by the surface of the substrate, by a vertical surface 80, and by raised circular ring 82. The surface of the substrate forming a portion of the chamber can be exposed to various solvents by injecting such solvents into the chamber through an inlet 83 positioned inside the ring 82. The solvents exit the chamber through an outlet 84 positioned inside the ring. Page 66, lines 2-9; page 65, lines 16-26. Accordingly, the use of the flow cell 30 disclosed by Blanchard involves injecting solvents into a chamber formed in part by

the substrate itself, and the substrate itself thus is not "submerged" or "dipped" into solvents, etc. as recited in the steps of Example 2 described above, as proposed by the Examiner. It appears that use of the flow cell with reference to Example 2 above would relate only to the acetonitrile rinsing, which would be repeated in a single flow cell; the submerging and dipping steps in Example 2 may be performed outside of the flow cell. Thus, contrary to the assertion in the Action, Example 2 of Blanchard does not teach or suggest performance of the above-referenced submerging or dipping steps in a flow cell, and thus does not "clearly suggest[] that the substrates are transported to different flow cells for the (b) acetonitrile rinsing, (c) oxidation, (d) acetonitrile rinsing, (e) dimethoxytrityl deprotecting and (f) acetonitrile rinsing steps."

Applicants submit that Blanchard discloses merely the known technique of using a single flow cell to carry out multiple processing steps, which is consistent with Example 2 (e.g., performing multiple acetonitrile rinsing steps in a single flow cell), as discussed above. Although Blanchard discloses that the Blanchard device may include multiple flow cells, Blanchard simply does not teach or suggest moving a support from one flow cell to another, different flow cell. Applicants submit that the argument and conclusion in the Action is the result of hindsight reasoning that includes knowledge gleaned only from the Applicants' disclosure.

Applicants have previously asserted that the multiple flow cells relate "only to multi-tasking, that is, concomitantly synthesizing arrays on the surface of several substrates using a separate flow cell for each substrate." While this is noted in the Action, the Action further states that Applicants have not provided any teaching of Blanchard in support of this assertion. See page 7. In response thereto, Applicants

direct the Examiner's attention to Example 2 and the discussion thereof above. In further response thereto, Applicants direct the Examiner's attention to page 64, lines 17-24 which refers to the single flow cell 30 of Figure 9 and states that is used "[s]pecifically . . . for washing off unattached monomers, exposing the substrate to an oxidizing solution, and deprotecting the terminal nucleoside of the oligonucleotides being formed for the next round of synthesis", and thus is a teaching of use of a single flow cell for multiple different steps in a synthesis process that involve different solvents, etc. Further, the Examiner's attention is directed to page 64, line 25 – page 66, line 12, which describes a single sealed chamber for exposing a portion of the substrate to "various solvents by injecting such solvents into the chamber through inlet 83. The solvents exit the chamber through outlet 84. This aspect of the invention is automated by utilizing solenoid controlled valves in conjunction with solvent containers and appropriate tubing (not shown)." (emphasis added to illustrate the plural references). This is a teaching of using multiple solvents, in multiple synthesis steps, in a single flow cell. Accordingly, Blanchard's teaching of use of multiple flow cells involves multiple uses, as the use is described in Blanchard, of the single flow cell. Accordingly, Blanchard teaches multiple syntheses, each carried out in a single respective flow cell, but does not teach or suggest a single synthesis conducted across multiple flow cells, and thus does not teach or suggest moving a single support from one flow cell to another, different flow cell.

Further still, there cannot be motivation to modify Blanchard to arrive at the claimed invention, because doing so would change the principle of operation of Blanchard, which provides for use of multiple different solvents, in multiple synthesis

steps, in a single flow cell, and/or would render unsuitable for their intended purpose the solenoid controlled valves for introducing multiple different solvents into a single flow cell.

For at least these reasons, the Examiner has not established a *prima facie* case of obviousness with respect to claim 30.

Claim 33 depends from claim 30. Without acquiescing in the arguments in the Action, Applicants submit that Blanchard is deficient as demonstrated above in not disclosing or suggesting the apparatus of claim 30. Accordingly, since independent claim 30 is nonobvious, claim 33 depending therefrom are also nonobvious. *In re Fine*, 837 F.2d, 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) (MPEP 2143.03).

For at least these reasons, reconsideration and withdrawal of the rejections of claims 30 and 33 are requested respectfully.

Claims 32 and 34-39

Claims 32 and 34-39 depend from claim 30. Without acquiescing in the arguments in the Action, Applicants submit that Blanchard is deficient as demonstrated above in not disclosing or suggesting the apparatus of claim 30, and this deficiency is not cured by Goldberg, Hillman or Nokihara. Accordingly, since independent claim 30 is nonobvious, claims 32 and 34-39 depending therefrom are also nonobvious. *In re Fine*, 837 F.2d, 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) (MPEP 2143.03).

For at least these reasons, reconsideration and withdrawal of the rejections of claims 32 and 34-39 are requested respectfully.

Claim 38

Claim 38 depends from claim 30 and is likewise patentable; the deficiency in Blanchard discussed above with reference to claim 30 is not cured by Kedar. In addition, claim 38 recites that the apparatus further comprises "a sensor in fluid communication with said outlet wherein said sensor is configured to determine the condition of a fluid reagent, and, is further configured, based on said determination, to communicate with a valve to direct at least a portion or all of the fluid reagent to the inlet of a flow cell to be combined with fresh fluid reagent or sent to waste." Kedar neither teaches nor suggests a sensor that is "configured to determine the condition of a fluid reagent, and . . . to communicate with a valve to direct at least a portion or all of the fluid reagent to the inlet of a flow cell to be combined with fresh fluid reagent or sent to waste." Instead, the portion of Kedar relied upon by the Examiner (#101S-119S, col. 74, lines 46-56 and col. 77, lines 35-46) discloses "an optical sensor 680 for use in detecting the presence or absence of a fluid within a substantially translucent Teflon tube." Col. 74, lines 46-56. Kedar does not disclose a sensor communicating with a valve to direct at least a portion or all of a fluid reagent to the inlet, or to waste, based on a condition of the fluid determined by the sensor. Accordingly, contrary to the Examiner's assertion in paragraph 13 of the Action, not all claim limitations are taught or suggested by the cited art. Further, there cannot be motivation to modify the sensor of Kedar to arrive at the claimed invention, because doing so would change the principle of operation of Kedar and/or render it unsuitable for its intended purpose, which involves detecting the presence or absence of fluid in a tube.

For at least this additional reason, reconsideration and withdrawal of the rejection of claim 38 are requested respectfully.

Claims 44-49

Independent claim 44 is directed to an apparatus for synthesizing an array of biopolymers on the surface of a support. Similarly to claim 30, claim 44 recites "a mechanism . . . for moving said support from one flow cell to a different flow cell" and "a controller for controlling the movement of said mechanism, said controller comprising a computer program that is configured . . . to cause said mechanism to move said support . . . from one flow cell to a different flow cell." This is neither taught nor suggested by Blanchard, as discussed above, and the deficiency in Blanchard is not cured by Goldberg, Nokihara or Hillman. Accordingly, reconsideration and withdrawal of the rejection of claim 44, and of claims 45-49 which depend from claim 44, are requested respectfully.

Claims 48 and 49 further recite "a sensor that is "configured to determine the condition of a fluid reagent, and is further configured . . . to communicate with a valve to direct at least a portion or all of the fluid reagent to the inlet of a flow cell to be combined with fresh fluid reagent or sent to waste", and thus includes recitations similar to those of claim 38. Reconsideration and withdrawal of the rejection of claims 48 and 49 are therefore requested for additional reasons similar to those set forth above for claim 38.

For at least these reasons, reconsideration and withdrawal of the rejection of claims 44-49 are requested respectfully.

IV. New Claim 50

New claim 50 depends from claim 30 and is likewise patentable. Claim 50 further recites that "each of said plurality of flow cells is dedicated to a respective step of a plurality of steps for synthesis of a chemical compound, said plurality of flow cells being collectively dedicated to said plurality of steps, each fluid dispensing station in fluid communication with a respective one of said plurality of flow cells being arranged to introduce a respective fluid for a respective one of said plurality of steps." For reasons similar to those set forth above for claim 30, this is neither taught nor suggested by the cited art. Therefore, allowance of new claim 50 is requested respectfully.

V. Obviousness-type Double Patenting Rejections

Claims 30, 31, 33, 34 and 39 stand provisionally rejected on the ground of nonstatutory obviousness-type double patenting over claims 23-28 of U.S. Application No. 10/172,470 in view of Blanchard. Applicants traverse, for the reasons set forth in Applicant's last Reply, and for the reasons set forth above with reference to claim 30. More specifically, Applicants submit that claims 23-28 of the '470 application neither teach nor suggest a controller is configured to move the support to and from one flow cell and a different flow cell, as recited by claim 30. Further, Applicant will review options for proceeding with regard to possible submission of a terminal disclaimer upon issuance of the '470 application, which is the basis for the provisional rejection.

Claims 30, 32-39 and 44-49 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-20 of U.S.

Patent No. 6,846,454 in view of Blanchard. More specifically, the Examiner acknowledges that the claims are not identical, but asserts that they are not patentably distinct. Applicants traverse for the reasons set forth above with reference to claims 30 and 44, i.e. that claims 30 and 44 recite a mechanism and a controller that comprises a computer program that is configured to cause the mechanism to move the support from one flow cell to a different flow cell. As discussed above, Blanchard is devoid of any teaching or suggestion of moving the support from one flow cell to a different flow cell, and cannot provide motivation for modifying the '454 patent to arrive at the claimed invention.

Claims 30, 32-39 and 44-49 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-20 of U.S. Patent No. 6,713,023 in view of Blanchard. More specifically, the Examiner acknowledges that the claims are not identical, but asserts that they are not patentably distinct. Applicants traverse for the reasons set forth above with reference to claims 30 and 44, i.e. that claims 30 and 44 recite a mechanism and a controller that comprises a computer program that is configured to cause the mechanism to move the support from one flow cell to a different flow cell. As discussed above, Blanchard is devoid of any teaching or suggestion of moving the support to and from one flow cell to a different flow cell, and cannot provide motivation for modifying the '023 patent to arrive at the claimed invention.

CONCLUSION

In view of the foregoing amendments and remarks, Applicant believes claims 30, 32, 44-49 and 50 to be patentable and the application in condition for allowance, and request respectfully issuance of a Notice of Allowance. If any issues remain, the undersigned requests a telephone interview prior to the issuance of an action.

Respectfully submitted,

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